

Center for International Security Affairs



The Center for International Security Affairs (CISA) at Los Alamos National Laboratory was created in January 1995, to coordinate the growing number of interactions that the Laboratory has with the Newly Independent States, China, and other countries. CISA is responsible for all programs specifically created for work in these countries, including the laboratory-to-laboratory effort in nuclear materials control, our participation in the International Science and Technology Centers, the Los Alamos component of the Industrial Partnering Program, and more. In addition, CISA has oversight responsibility for other programmatic work to ensure that all Los Alamos activities abroad are consistent with U.S. objectives and policy.



Our collaborations involve the scientific leaders of the Russian nuclear weapons program. This June 1992 photo shows Yuli Khariton (second from front on right), the chief designer of the Russian atomic bomb, Yuri Trutnev (next to Khariton), chief designer of much of the Russian thermonuclear stockpile, and many other senior Russian weapons scientists. Today we are working together on problems of common interest including nuclear reactor safety, plasma physics, and the control of nuclear materials.

Weapons of mass destruction, and especially nuclear weapons, represent the only strategic threat to the United States. The principal objective of the programs coordinated by CISA is to actively reduce the threat of weapons of mass destruction through collaborative projects with colleagues overseas. In the Newly Independent States (NIS), the Center has three major goals: Stabilization of nuclear materials, stabilization of weapons expertise, and stabilization of weapons institutions.

Nuclear material protection, control, and accounting is by far the largest of the programs overseen by CISA. As the lead lab for this effort, Los Alamos works closely with other U.S. laboratories and our counterparts in Russia. Although this program was begun only in April 1994, progress has been very rapid as new Russian facilities are added to the list of participants and old barriers to implementation of the technology are removed.

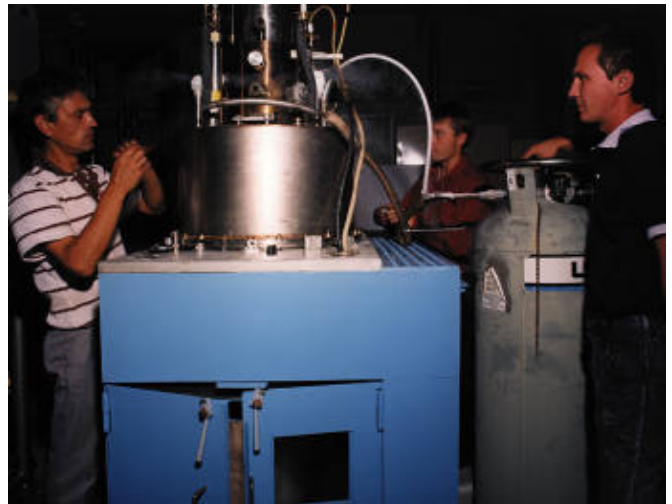
Los Alamos has extensive scientific interactions with the Russian nuclear weapons institutes in Arzamas-16 and Chelyabinsk-70. For example, as of the Spring of 1995, we had conducted sixteen major experiments in high explosive pulsed power with Arzamas-16. These experiments combine a considerable Russian lead in high energy pulsed

power with advanced Los Alamos diagnostics to do science that neither side could do on its own. Scientists that were previously involved in the development of nuclear weapons are now working on problems of fundamental scientific interest. This is a process that we call Scientific Conversion. The Industrial Partnering Program is directed at the long term stability of institutions that have been involved in weapons development. Its goal is to provide peaceful and profitable alternatives to weapons work through cooperative programs involving NIS scientists and engineers and U.S. national labs and industry. Los Alamos participates in over two dozen projects with institutes in several NIS states.

The Center for International Security Affairs is located in its own building at Technical Area-66 in Los Alamos. It has facilities for meetings of up to sixty people and can host foreign collaborators for extended periods. As the principal point of contact at Los Alamos for interactions in the NIS, China, and elsewhere, the Center can assist Laboratory personnel in establishing appropriate scientific projects and can provide the U.S. government and other organizations with information and advice on nuclear related issues worldwide.



Part of the nuclear material accounting system developed jointly by the Russian Federal Nuclear Center at Arzamas-16 and Los Alamos. Unauthorized movements of nuclear material represent the greatest near-term threat for the proliferation of nuclear weapons.



The Industrial Partnering Program provides long term opportunities for NIS scientists and engineers formerly involved in work on weapons of mass destruction. Here Russians, Ukrainians and Americans prepare an experiment on the microwave processing of materials.



Our collaboration extends beyond pure science. Los Alamos and Arzamas-16 are sister cities with many non-technical interactions including school pen-pal programs, teacher exchanges, and medical assistance. These efforts are funded by the Los Alamos community. Here a group of Russian colleagues examines a friendship book prepared by Los Alamos Middle School students.

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Scientific Conversion: From Swords to Plowshares



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Russian and American nuclear weapons laboratories share a common problem: How to convert to peaceful applications the considerable scientific and technological expertise developed as part of their Cold War nuclear weapons programs. Scientific Conversion, a concept developed at Los Alamos in 1993, aims to engage core nuclear weapons scientists and engineers on topics of basic scientific interest and reintegrate them into the international scientific community. An extension of our highly successful scientific collaborations with the Russian Federal Nuclear Centers, Scientific Conversion has resulted in hundreds of former weapons specialists finding new and productive work in non-weapons related areas.

The first scientific collaboration between Russian and American nuclear weapons laboratories was developed during a Los Alamos visit to Arzamas-16 in June 1992. Agreements were signed to collaborate on the production and utilization of ultrahigh magnetic fields for fundamental scientific applications. The first contracts were signed in November of that year and, after much effort on both sides, they came to fruition on September 22, 1993, when the first joint scientific experiment involving the nuclear weapons centers of Russia and the United States was conducted at a location formerly used for the development of Soviet nuclear weapons.

High explosive pulsed power utilizes the chemical energy stored in explosives to compress a magnetic field. By the laws of electrodynamics, when a magnetic field is compressed the electrical current flowing in the original circuit is greatly amplified. Beginning with the pioneering work of Nobel Laureate Andrei Sakharov, Arzamas-16 has developed an impressive program of research in explosively driven pulsed power that is currently the most advanced in the world. Los Alamos has the only counterpart to this program in the United States and has the world's most advanced measurement instrumentation. By combining Russian pulsed power generators with Los



The first joint scientific experiment ever conducted by the nuclear weapons laboratories of the United States and Russia. Shown here is a view of a unique Russian high explosive driven pulsed power generator with Los Alamos computer controlled diagnostics installed to measure its performance in greater detail than previously possible. (Russian Federal Nuclear Center at Arzamas-16, Russia, September 22, 1993)

Alamos expertise in precision measurements, we are investigating fundamental problems in materials science, the behavior of matter under extreme pressure (such as is found in the atmospheres of planets like Jupiter and Saturn), and a promising Russian idea for thermonuclear fusion.

In January 1994, Los Alamos signed the first umbrella contract between a U.S. national laboratory and a Russian nuclear weapons institute. This document, signed by the directors of Los Alamos and the Russian

Federal Nuclear Center at Arzamas-16, established a mechanism for collaboration on a wide range of topics and moved international collaboration from the extraordinary to the ordinary.

As of Spring 1995, Los Alamos and Arzamas-16 have collaborated on sixteen major experiments in high energy pulsed power and a host of other topics as diverse as the theory of colliding plasmas and properties of high temperature superconductors. The U.S. side has obtained access to exciting new technology that has broadened our ability to perform experiments in high-energy density physics. The Russians have gained an introduction to the international scientific community, a vitally important step in their drive toward self-sufficiency in the new Russia. More importantly, however, both sides have developed a unique trust and understanding that has enabled us to undertake programs in many other areas, including the laboratory-to-laboratory effort in nuclear material control.



Los Alamos scientists at a site formerly used to develop high explosive components for Russian nuclear weapons. This joint experiment examined the properties of magnetized plasmas, following a line of research established by Nobel Peace Prize winner Andrei Sakharov.

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Russians and Americans work together on a high explosive pulsed power experiment at Ancho Canyon, Los Alamos. The purpose of this experiment was to measure the critical magnetic fields of a high temperature superconductor.

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